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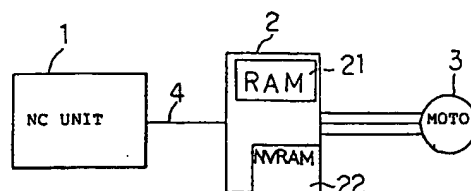
54 **MOTOR CONTROLLER.**

EP 0 375 786 A1

57 A motor controller for an NC machine tool having many kinds of motor models. When the control parameters corresponding to the motor models are set from the external side, correct control parameters are set for the motor models to reliably prevent any accident that may be caused by erroneous setting of the control parameters. The motor controller has registration means (22) into which will be registered specific model codes that represent control parameters of the motor models, and storage means (21) that temporarily stores the control parameters that are set and the model codes that are

transferred. The model codes registered to the registration means (22) are compared with the model codes that are transferred, to recognize the motor models.

Fig. 1



DESCRIPTION

MOTOR CONTROL APPARATUS

Technical Field

5 This invention relates to a motor control
apparatus in which, when a machine tool controlled by a
numerical control unit or the like employs a large
variety of motor models, control parameters
corresponding to these motor models can be set and
changed externally.

10 Background Art

In an ordinary numerical control unit, control
parameters regarding acceleration, rapid-traverse
velocity and the like are entered from, say, an MDI/DPL
unit in accordance with the motor model which is the
15 object of control, and the control parameters
corresponding to the motor control apparatus are set
before the machine tool starts operating. These
parameters are set in addition to the program which
applies control commands to the machine tool. Since
20 machine tools controlled by a numerical control unit or
the like often employ a wide variety of motor models at
the same time, it is necessary to set accurate control
parameters corresponding to each of these motor models,
and it is essential to maintain universality of
25 numerical control in the motor control apparatus.

The operation for setting the control parameters
by means of the conventional numerical control unit
requires that tens of control parameters be specified

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for each type of motor model and that these parameters be set in the motor control apparatus. Since the procedure for setting these control parameters usually is a manual task performed by the operator, there is
5 the possibility that an accident can be caused due to erroneous setting of the control parameters. Further, in a case where the control parameters are set in an NC tape along with a machining program without relying upon a manual operation, it is possible to read the
10 parameters automatically and set them in the motor control apparatus before the program is run. However, even in this case it is necessary to accurately detect agreement between the motor model to be controlled and the machining program, and erroneous settings sometimes
15 occur.

Disclosure of the Invention

The present invention has been devised in order to solve these problems and its object is to provide a motor control apparatus in which the operation for
20 recognizing motor model is automated and accidents caused by erroneous setting of control parameters are reliably prevented.

In accordance with the present invention, there can be provided a motor control apparatus for
25 controlling motors having different control parameters, in which the control parameters can be set and changed externally and a large variety of motor models are capable of being controlled selectively, characterized

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by comprising registering means in which a specific model code representing the control parameters of a respective motor model is registered in selecting any of the motors, memory means for temporarily storing the set control parameters as well as a model code
5 transferred along with the control parameters, and comparing means for comparing the model code registered in the registering means with the transferred model code.

10 The motor control apparatus of the present invention is such that the model code of a motor model to be controlled is registered and agreement is obtained between this code and the model code stored in memory at the same time as the transferred control
15 parameters. As a result, the operator is capable of identifying the motor model with assurance.

Brief Description of the Drawings

Fig. 1 is a block diagram illustrating an embodiment of the invention, and Fig. 2 is a view
20 illustrating an operating flow for identifying a motor model.

Best Mode for Carrying Out the Invention

An embodiment of the present invention will now be described in detail with reference to the drawings.

25 Fig. 1 is a diagram showing the basic construction of a system which includes an NC unit 1 for forming the control commands of a machine tool.

A motor control apparatus 2 in which control

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parameters can be variably set in a memory circuit such as a RAM from the outside is provided to correspond to each servomotor 3 of a respective machine tool. The motor 3 is for driving a spindle or workpiece table along each axis in accordance with a predetermined controlled variable. The NC unit 1 and the motor control apparatus 2 are interconnected by a data line 4 so that transfer of the necessary control information can be carried out. It can be arranged so that all or a portion of the circuitry of the motor control apparatus 2 is contained in the NC unit 1.

The motor control apparatus 2 has memory means, e.g., a RAM 21, for storing control parameters conforming to the type of motor 3 connected, registering means, e.g., an NVRAM (non-volatile random-access memory) 22 in which is registered a preset model code Co of the motor to be driven and controlled, and comparing means such as a microprocessor for comparing a model code Cl, which is included in the control parameters transferred to the RAM 21, with the registered model code Co.

The NVRAM 22 serving as the registering means is a non-volatile memory circuit and is exchangeable with other similarly operating circuits, such as an EEPROM (electrical erasable programmable) ROM. When a set model is changed, the model code can be written anew at any time.

Fig. 2 shows the operating flow for identifying a

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motor model.

The procedure through which specific control parameters are set in the motor control apparatus 2 first involves registering, in the NVRAM 22, the model code of the motor 3 used. It is possible to perform this when the machine tool is assembled. For example, the NVRAM 22 having the predetermined model code stored therein may be installed in the motor control apparatus 2 (step a).

Next, the NC unit 1 transfers the model code (C1), along with the control parameters, to the RAM within the motor control apparatus 2 (step b).

It is determined within the motor control apparatus 2 whether the registered model code Co and the transferred model code C1 agree (step c). If they do agree, it is judged that the motor is capable of operating in accordance with the transferred control parameters. In other words, when agreement is achieved, transfer of the control parameters is completed (step d).

In case of non-agreement, the operator is informed of the fact that the transferred model data is erroneous (step e).

Thereafter, the model code C1 to be transferred is revised automatically or by the operator in the NC unit 1 (step f), and the revised model code C1 is transferred from the NC unit 1 to the RAM 21 in motor control apparatus 2 along with different control

parameters.

In any case, by virtue of the motor control apparatus 2, the operator is capable of acquiring accurate recognition of the motor model used by the machine tool and accidents due to erroneous setting of control parameters can be prevented with assurance.

It is permissible to adopt an arrangement in which the operator is merely provided with a prescribed alarm warning when non-agreement of codes is sensed at step

10 c.

Though an embodiment of the present invention has been described, the invention is not limited to this embodiment but can be modified in various ways without departing from the scope of the claims.

15 Industrial Applicability

The motor control apparatus of the present invention is such that a model code is set in advance and it is determined whether control parameters transferred from an NC unit have been transferred correctly. As a result, the risk of erroneous control parameter settings is eliminated, maintenance is simplified and accidents can be prevented.

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CLAIMS:

1. A motor control apparatus for controlling motors
having different control parameters, in which the
control parameters can be set and changed externally
5 and a large variety of motor models are capable of
being controlled selectively, said apparatus
comprising:

registering means in which a specific model code
representing the control parameters of a respective
10 motor model is registered in selecting any of said
motors;

memory means for temporarily storing said set
control parameters as well as a model code transferred
along with the control parameters; and

15 comparing means for comparing the model code
registered in said registering means with the
transferred model code.

2. A motor control apparatus according to claim 1,
characterized in that an operator is issued an alarm by
20 said comparing means if a model code different from
that of the registered model code is transferred.

Fig. 1

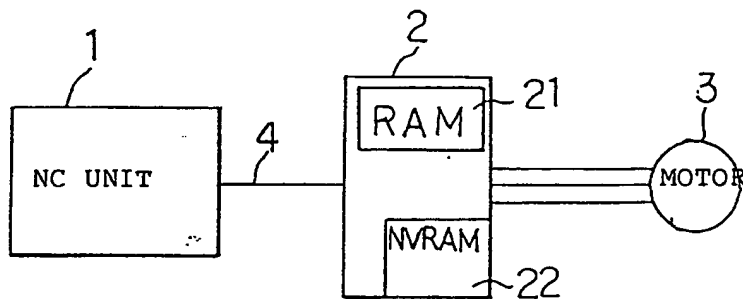
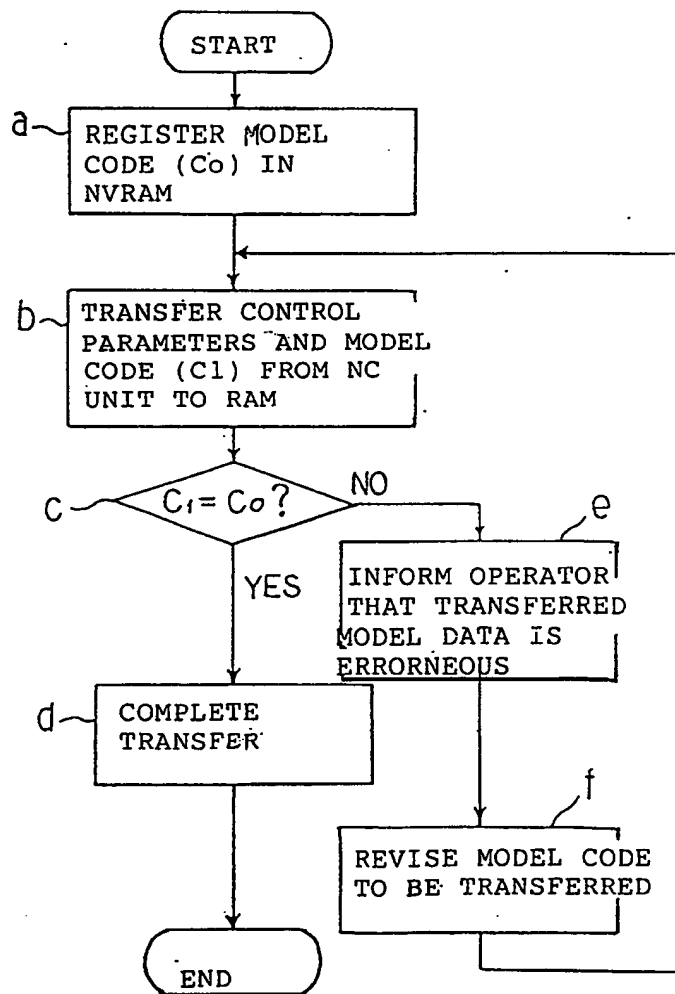


Fig. 2



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP89/00534

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC <div style="text-align: center; margin-top: 10px;"> Int. Cl⁴ H02P5/00, 5/46 </div>										
II. FIELDS SEARCHED <div style="text-align: center; margin-top: 10px;"> Minimum Documentation Searched ⁷ </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 30%;">Classification System</th> <th style="width: 70%;">Classification Symbols</th> </tr> <tr> <td style="text-align: center; padding: 5px;">IPC</td> <td style="text-align: center; padding: 5px;">H02P5/00, 5/46</td> </tr> </table> <div style="text-align: center; margin-top: 10px;"> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸ </div> <div style="margin-top: 10px;"> <table style="width: 100%;"> <tr> <td style="width: 50%;">Jitsuyo Shinan Koho</td> <td style="width: 50%;">1960 - 1988</td> </tr> <tr> <td>Kokai Jitsuyo Shinan Koho</td> <td>1971 - 1988</td> </tr> </table> </div>			Classification System	Classification Symbols	IPC	H02P5/00, 5/46	Jitsuyo Shinan Koho	1960 - 1988	Kokai Jitsuyo Shinan Koho	1971 - 1988
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">Category ⁹</th> <th style="width: 60%;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 30%;">Relevant to Claim No. ¹³</th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 10px;">X</td> <td style="padding: 10px;"> JP, A, 61-196788 (Fanuc Ltd.) 30 August 1986 (30. 08. 86) (Family: none) </td> <td style="text-align: center; vertical-align: top; padding: 10px;">1 - 2</td> </tr> </table>			Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	JP, A, 61-196788 (Fanuc Ltd.) 30 August 1986 (30. 08. 86) (Family: none)	1 - 2		
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </div> </div>										
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search <div style="text-align: center; margin-top: 5px;">August 18, 1989 (18. 08. 89)</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center; margin-top: 5px;">September 4, 1989 (04. 09. 89)</div> </td> </tr> <tr> <td style="width: 50%; padding: 5px;"> International Searching Authority <div style="text-align: center; margin-top: 5px;">Japanese Patent Office</div> </td> <td style="width: 50%; padding: 5px;"> Signature of Authorized Officer </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center; margin-top: 5px;">August 18, 1989 (18. 08. 89)</div>	Date of Mailing of this International Search Report <div style="text-align: center; margin-top: 5px;">September 4, 1989 (04. 09. 89)</div>	International Searching Authority <div style="text-align: center; margin-top: 5px;">Japanese Patent Office</div>	Signature of Authorized Officer				
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